Pierre Wiltzius
Director
Beckman Institute for Advanced Science and Technology
University of Illinois at Urbana-Champaign

Profile

Pierre Wiltzius received his Ph.D. in physics from the Swiss Federal Institute of Technology (ETHZ), Zurich, Switzerland in 1981. He was at Bell Laboratories, Lucent Technologies (formerly AT&T) between 1984 and 2001, where he was most recently the Director of Semiconductor Physics Research. He was appointed Director of the Beckman Institute in September 2001; a professor in both the Departments of Materials Science and Engineering, and Physics; and a full-time Beckman Institute faculty member in the Nanoelectronics and Biophotonics Group. His fields of professional interest are soft-condensed matter, colloidal self-assembly, photonic crystals and microphotonics.

Awards and honors

Fellow of: American Physical Society; Fellow of the American Association for the Advancement of Science; Senior Member of the IEEE; R&D100 Innovation Award from R&D Magazine (2001); Industrial Visitor of the James Franck Institute at the University of Chicago (1994); Distinguished Member of Technical Staff, Bell Laboratories (1991); Robert Mehrabian Distinguished Lecturer at U.C.S.B. (1987); NATO Fellowship (1983).

Recent Publications

J. Aizenberg, P. V. Braun, and P. Wiltzius, Patterned Colloidal Deposition Controlled by Electrostatic and Capillary Forces, Phys. Rev. Lett. *84*, 2997 (2000).

S. Friebel, J. Aizenberg, S. Abad, and P. Wiltzius, Ultraviolet Lithography of Self-Assembled Monolayers for Submicron Patterned Deposition, Appl. Phys. Lett. *77*, 2406 (2000).

P. V. Braun and P. Wiltzius, Electrochemical Fabrication of 3D Microperiodic Porous Materials, Adv. Mater., *13,* 482 (2001).

P. Mach, R. Nortrup, J. A Rogers, and P. Wiltzius Monolithically Integrated, Flexible Display of Polymer-Dispersed Liquid Crystal Driven by Rubber-Stamped Organic Thin-Film Transistors, Appl. Phys. Lett. *78*, 3592 (2001).

P. V. Braun, R. W. Zehner, C. A. White, M. K. Weldon, C. Kloc, S. S. Patel and P. Wiltzius, Optical Spectroscopy of High Dielectric Contrast 3D Photonic Crystals, Europhysics Letters in press (2001).

A. Polman and P. Wiltzius, Materials Science Aspects of Photonic Crystals, MRS Bulletin, August 2001.

Beckman Institute Research

Interdisciplinary research has been central to Wiltzius' professional career. His Ph.D. thesis was on aspects of blood coagulation and was based on a collaboration between physicists and clinical physicians. The passion for multidisciplinary research led him to spend 17 years at Bell Laboratories, where he collaborated with scientists and engineers

from many different fields. Research topics include polymer physics, critical phenomena, phase separation, spinodal decomposition, nucleation and growth, colloidal aggregation and self-assembly, liquid crystals, sol-gel phenomena, and block copolymers.

In his function as a Director of the Beckman Institute Wiltzius will stimulate and encourage broad interactions between researchers from different disciplines and knowledge bases who are interested in interdisciplinary research. His vision for the Institute is that of a world-class leading edge organization, which is a model for multidisciplinary research within an academic setting. Wiltzius is also interested in securing valuable intellectual property and creating opportunities for practical applications.

Wiltzius' research interests are in self-assembly processes in soft-condensed matter systems, e.g., polymers, liquid crystals and colloids. Colloidal self-assembly, in particular, is a promising approach to build 3-dimensional "photonic crystals". These crystals will be building blocks for highly integrated, functional microphotonic devices. Wiltzius plans to use biologically inspired approaches to self-assembly by using colloids which are functionalized with appropriate surface groups (DNA oligomers, antigen-antibodies). He will also explore other approaches to creating nanostructured microperiodic materials. Candidates are multibeam holography, two- and multiphoton lithography, and soft-lithography.